TETHER PLATFORMS–AN IMPROVED TECHNIQUE FOR RAPTOR FOOD HABITS STUDY

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ABSTRACT. Newly designed platforms were used to tether young raptors for food habits studies. The major advantage of platforms over ground tethering was a reduced mortality of tethered young. The tether platform also facilitated collection of pellets and prey remains. Information on the construction and placement of the platform and care of the tethered young is provided. A bimodal peak was observed in the daily feeding routine of hawks in Illinois.

Introduction

Many raptor food habits studies have utilized the technique of Errington (1932) to collect prey items. Tethered young can provide data considerably beyond the normal fledging data. Depending upon the disposition of individual adult birds, Red-tailed Hawks (*Buteo jamaicensis*) will feed their tethered young four to six weeks after the normal fledging period. Great Horned Owls (*Bubo virginianus*) have been known to care for their tethered owlets for eight to ten weeks after the time they normally fledge (Errington 1932).

One major disadvantage of tethering is that mortality of the young is increased. Errington (1932) stated in his description of the technique that "the investigator must reconcile himself to some mortality among his tethered raptors." Frances Hamerstrom (pers. comm.) has stated that mortality losses as high as 50 percent can be expected. A principal cause of mortality in tethered young is predation. Luttich et al. (1971) and McInvaille and Keith (1974), in studies of tethered Red-tailed Hawks and Great Horned Owls in Alberta, reported losses of young in excess of 35 percent. Some of this mortality was due to predation, the primary predator being other Great Horned Owls. In more southern latitudes, such as the locations of the present studies in Wisconsin and Illinois, mammalian predators as well as Great Horned Owls were considered a significant threat to tethered young. Studies documenting the extent of losses of young tethered on the ground from areas other than Alberta are lacking.

Two independent investigations of raptor food habits began in 1972. One study was initiated by the Wisconsin Department of Natural Resources, Farm Wildlife Research Group, in southern Wisconsin. The other study was conducted in north-central Illinois under the supervision of the Department of Wildlife Ecology, University of Wisconsin, Madison. Both investigators attempted to improve upon the tethering technique described by Errington (1932) by using specially constructed tether platforms. Since the platforms used in the two studies were developed independently, the designs were different. In this paper we describe a single platform which combines the better features of both designs.

Materials and Construction

The tether platform was mounted over a framed underhanging screen. The platform was also framed with 1" x 3" and 2" x 4" oil-stained fir or pine lumber, with a base of 4-foot wooden lath. Oil stain protected the lumber from the elements and served as a preservative and camouflage. Platform size was dependent upon the number of young being tethered. The following details pertain to one- and two-bird platforms. The outside dimensions (OD's) of a one-bird platform were 4' x 4', and the OD's of a two-bird platform were 4' x 6' (Fig. 1).

The underhanging screen (Fig. 2) was made of 1" x 3" lumber stock nailed together on edge with OD's corresponding to the one- or two-bird platform size. A 4' x 4' or 4' x 6' section of 0.25-inch galvanized wire mesh covered the bottom of the wooden frame, forming, with the lath base and the frames, a large shallow box with a screened bottom. The framed screen was attached to the underside of the platform by small screw eyes and wire and caught materials falling through the slotted floor of the platform (Fig. 3).

Platforms were mounted on trees or poles. The frame of the tree-mounted platform was constructed of 1" x 3" and 2" x 4" stock, and the extended 2" x 4" side was nailed to the tree. The pole-mounted platform was similar but supported by four wooden or fiberglass poles.

For a one-bird platform, a 4-foot section of 1" x 3" lumber was nailed on the bottom centers of the opposite 1" x 3" stock, forming an anchoring base for the tethered bird. A two-bird platform required two anchoring bases, centered 20 inches from the two edges. The remaining area on either side of the tether base was filled with spaced wooden laths. The spacing between laths varied from 0.25" near the anchor base to 1" near the outside edge of the platform frame. These spaces permitted pellets and partially consumed pieces of prey to fall through; they also provided good footing for the tethered bird and temporarily held fresh prey brought in by parent birds (Fig. 4).

A wooden apple crate was nailed to the platform for each tethered young to provide shelter from the hot afternoon sun and severe storms. For maximum protection the open end of the boxes faced southeast. The shelter may also have provided a measure of protection from avian predators.

Results and Discussion

Placement of Platform. The tether platform was placed 5 feet off the ground and close to the nest site. Although hunger cries of the young probably assist the parent birds in locating their offspring, we believe it is important to place the platform so that it can easily be seen by the adult birds. Initial acceptance of the platform-tethered birds is enhanced if the young are readily visible. Platforms should be located where they will be free from unwanted human disturbance; small clearings or woodlot edges provide ideal placement sites.

The approach by parent birds should be considered carefully when placing the tether platform. This factor is critical when two or more nestlings are tethered. One of our birds starved, perhaps because adults continually approached from one end of the platform. We feel that proper platform placement would encourage adults to carry food to the middle of the platform, between the tethered offspring. Both young then have equal opportunity to feed. Shrub and small tree obstacles along the front or long edge of the platform were removed to facilitate approach. As a precautionary measure, the tethered raptors were interchanged from one anchoring base to the other at each visit.

Tethering and Care of Young. Young birds are tethered to a 0.25" x 3" eyebolt running through the center point of the anchor bases. Two nuts locked together allow the eyebolt to turn freely. Aylmeri jesses using 0.32" brass grommets and two no. 8 ball-bearing swivels (Sampo, Inc., Barneveld, NY) were attached to a 3/8" connecting link with a third swivel fitted into the eyebolt (Fig. 5). The connecting link permitted quick and safe removal of a bird from the platform for weight measurements, plumage checks, and the collection of other information. The three-swivel design eliminated twisting and binding of jesses. If more than one young is tethered, tether lengths should be adjusted to allow the maximum movement while keeping the birds separated. However, the length of the jesses must be short enough to prevent tethered young from falling over the edge of the platform. Jess oiling (or replacement) and adjustments to maintain a stable platform were the only maintenace services required.

The platforms were visited biweekly to collect food habits data and to check on the condition of the tethered young. Stable or increasing body weights indicated that the adults were providing sufficient food. Supplemental feeding (fresh or frozen road kills) were occasionally used when weight losses were evident. Before release, birds showing low weights (15 to 20 percent loss) received supplemental feeding for a week in order to build up their strength.

Adults will not continue to feed the young indefinitely. If the young are still tethered when amounts of food brought to the platform decline, the tethered birds should be released. Body weight of the young provides an index to amount of food delivered. Day-to-day fluctuations in body weight are common, but if a bird loses 25 percent of its body weight, it should be released. Ideally, tethered young should be released prior to any weight loss. All birds at one site should be released together to avoid the possibility of parental desertion of any young still tethered. In our studies, all tethered young were released by mid-July.

Collection of Data. Great Horned Owl pellets are an accurate, durable, and easily collected source of food habits data. Therefore, the frequency of visits to owl platforms was dependent on the necessity to check body weights. Although Craighead and Craighead (1956), Fitch, Swenson, and Tillotson (1946), and Seidensticker (1970) determined Red-tailed Hawk food habits from pellet examinations alone, prey remains and gullet samples can provide additional data (Errington 1932). Since prey is often completely consumed and food passes through the gullet in a matter of hours, daily visits to tethered Red-tailed Hawks are advisable. It is important to remove any evidence of prey items from the platform after each visit. A wire brush worked well for cleaning the platform, thus reducing the chance of recounting a piece of fur or feather in subsequent visits.

During 1973 in our Illinois study, we attempted to determine if visits to Red-tailed Hawk tether sites during a particular time of day would yield greater numbers of food items. Five tether sites involving 12 tethered young were visited 2 to 3 times daily. Visit times were varied. The time of arrival at each nest site was recorded to the nearest hour, and the presence and number of identifiable prey remains on the platform or in the gullet were noted. Prey remains found during one visit were marked and left at the site, and their presence was recorded during subsequent visits. If the young birds had not been fed prior to the visit, prey remains were often absent since small prey items were often entirely consumed.

Both the percentage of successful visits and number of prey items per visit increased sharply between 1100 and 1300 hours. A lesser peak occurred between 1500 and 1600 (Fig. 6). Fitch, Glading, and House (1946), working from blinds, found that the highest intensity of feeding among Cooper's Hawks (*Accipiter cooperii*) was from 0900-1100 and from 1500-1700. The authors hypothesized that these times corresponded to increased prey activity periods. The data from Illinois also indicated that Red-tailed Hawks concentrate their feeding of nestlings during certain times of the day when prey can be most efficiently collected.

Mortality of Tethered Young. The Illinois study involved 18 young Red-tailed Hawks and 3 Great Horned Owls. One Red-tailed Hawk died of starvation (a 6 percent loss). There were 3 siblings tethered at this site; the other 2 maintained their weight and fledged successfully. No problems developed at two other platforms on which 3 young had been tethered.

The amount of data collected at each site was directly proportional to the number of tethered young. It was therefore advantageous to tether more than 2 siblings, but the risk factors (starvation, cannibalism) became important considerations.

From a total of 60 tethered young raptors (26 Red-tailed Hawks and 34 Great Horned Owls) in the Wisconsin study, 11 birds (or 18 percent) died of starvation. However, in the spring of 1974, with supplemental feeding and rotation of tethered birds on the platform, the starvation rate was only 6 percent (1 out of 18).

Exposure losses occurred (2 of 60) when nestlings were placed on the platform too early. The adult raptors did not brood their offspring once tethered to the platform. Nestlings less than four weeks old apparently do not have sufficient plumage growth to protect them from adverse weather conditions. Handling and cannibalism were other causes of mortality (1 each). In both studies combined, only one bird tethered on a tree-mounted platform was lost to mammalian predation.

Radiotelemetry was used in the Wisconsin study to compare survival and behavior of tethered and nontethered raptor fledglings. There were no discernible differences in survival after the release of tethered young. For the first seven to ten days after fledging or after release from the tether platforms, both groups were very inactive. During the following two-week period, however, birds which had been tethered tended to be less active than their nontethered counterparts. Also, the formerly tethered birds avoided the investigator when approached with telemetry equipment.

Summary

The major advantage of platforms over ground tethering is a reduced mortality of tethered young. In addition to reducing mortality, the tether platform provides an efficient means of collecting pellets and prey remains. Data is also increased by preventing the adults from removing uneaten prey from the site, a practice previously reported for Red-tailed Hawks (Fitch, Swenson, and Tillotson 1946). Finally, the platforms are easily cleaned at each visit, which helps prevent duplication of data on subsequent visits.

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References Cited

Craighead, J. J., and F. C. Craighead, Jr. 1956. Hawks, owls and wildlife. Harrisburg, Pa.: Stackpole Co. and Washington, D.C.: Wildlife Management Institute. 443 pp.

Errington, P. L. 1932. Technique of raptor food habits study. Condor 34:75-86.

Fitch, H. S., F. Swenson, and D. F. Tillotson. 1946. Behavior and food habits of the Red-tailed Hawk. Condor 48:205-237.

Fitch, H. S., B. Glading, and V. House. 1946. Observations on Cooper Hawk nesting and predation. Calif. Fish & Game 32:144-154.

Luttich, S. N., L. B. Keith, and J. D. Stephenson. 1971. Population dynamics of the Red-tailed Hawk (*Buteo jamaicensis*) at Rochester, Alberta. Auk 88:75-87.

McInvaille, W. B., Jr., and L. B. Keith. 1974. Predator-prey relations and breeding biology of the Great Horned Owl and Red-tailed Hawk in central Alberta. Can. Field-Natur. 88(1):1-20.

Seidenstricker, J. C., IV. 1970. Food of nesting Red-tailed Hawks in southcentral Montana. Murrelet 51(3):38-40.

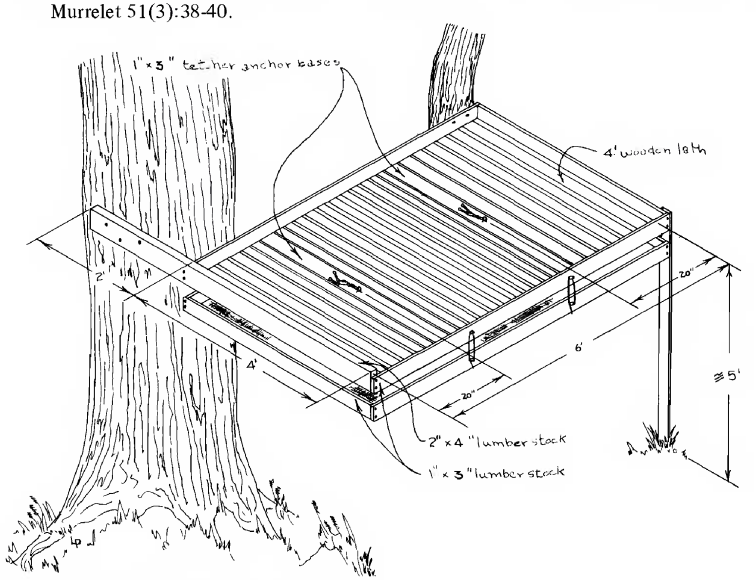

Fig. 1. A two-bird tether platform on a tree

Fig. 2. The platform and the underhanging screen

Fig. 3. The retractable underhanging screen catches prey remains and pellets

Fig. 4. The platform floor of spaced wooden laths and tether anchoring bases

Fig. 5. The three-swivel tethering system with connecting link

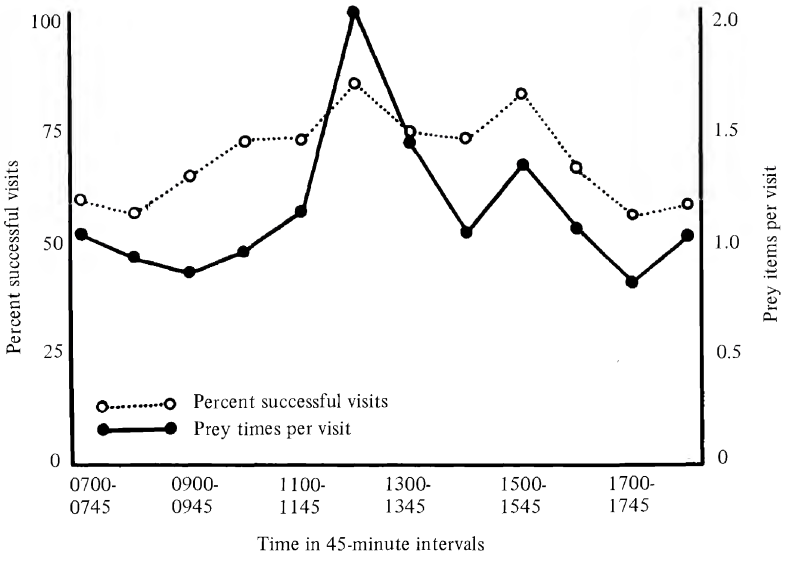

Figure 6. Prey remains and gullet samples collected from tethered Red-tailed Hawks.